A Presentation to US Army Corps of Engineers

Gas Fired Radiant Heating

A guide to application in production and maintenance buildings

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ENERGY EFFICIENT HEATING SYSTEMS

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Presentation Content

- Description of Radiant Heating
- Product Characteristics
- Energy Saving Features
- Heating Large Military Buildings – Factors to Consider
- Comparison of Heating Systems
  - **Case Studies**
- General References
- Open Forum

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Radiant Heating - Description

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What is Radiant Heat?

- Heat transfer by radiation involves two objects at different temperatures separated by a space transparent to the radiation
- Radiant or infra-red heating is the transfer of energy by means of electromagnetic waves (comparable to “light” - differs in frequency)
- When the waves strike an object they stimulate molecular activity, causing them to move rapidly and to generate heat

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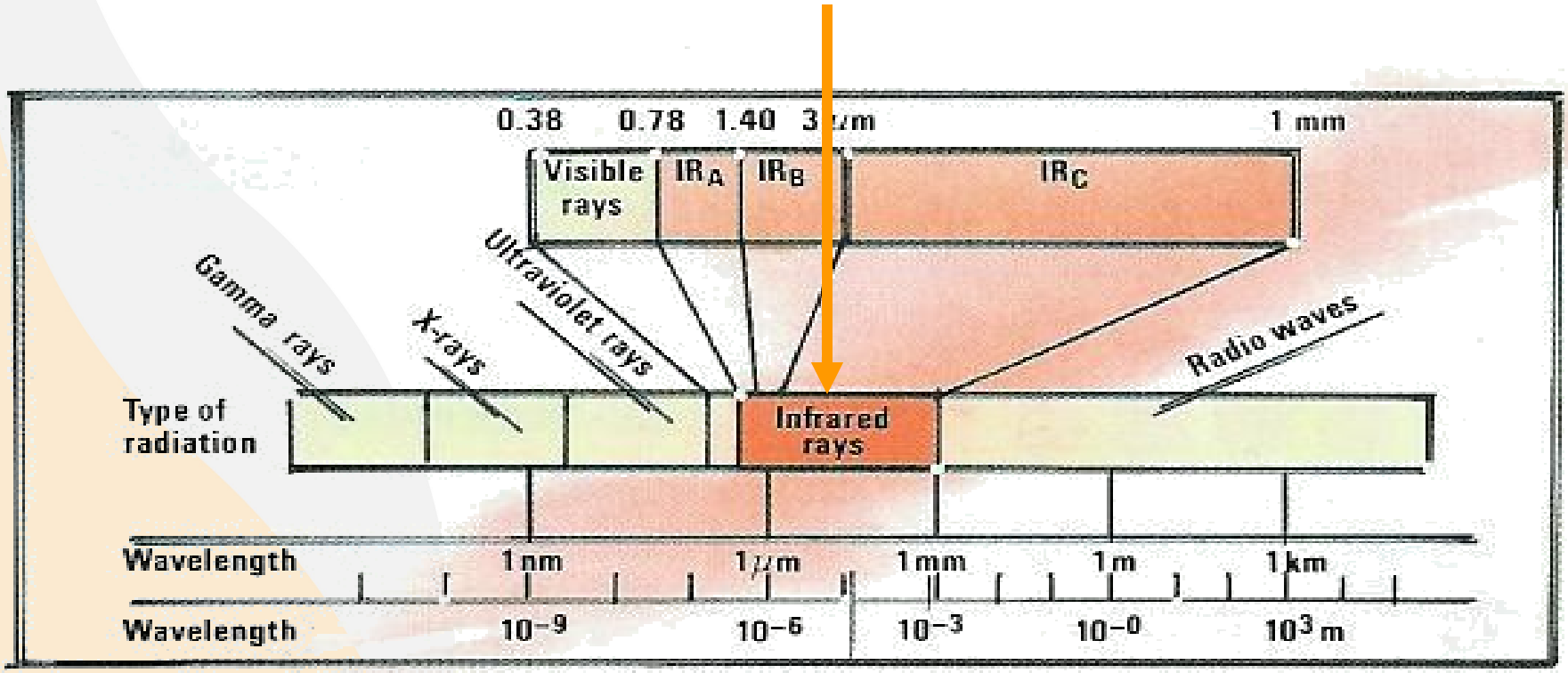
Low Frequency Infra-Red

Radiant tube heating 3 to 10 microns



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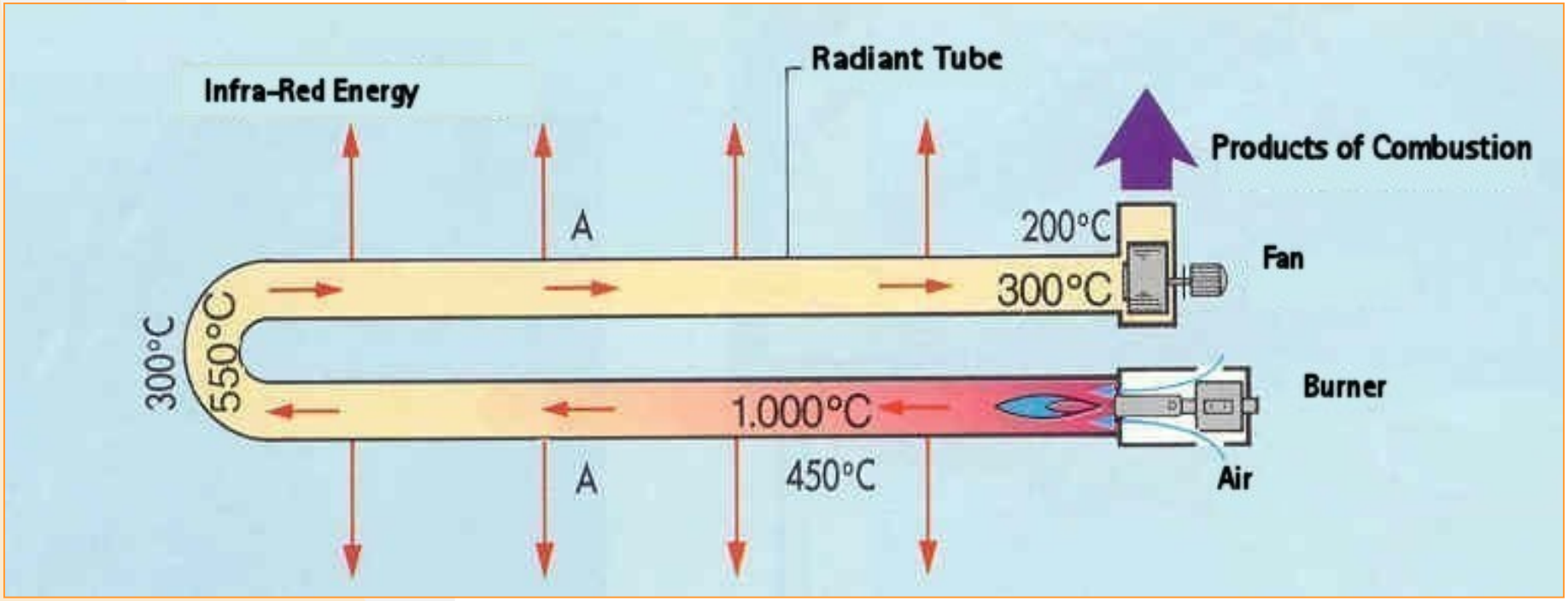
What Is Radiant Heat?

- Properties of radiant energy
- Emitted by hot surfaces
- Travels in straight lines
- Passes through the air without heating it
- Absorbed by cooler solid objects on which it falls

Radiant Heat
How it is Delivered?

- Mounted overhead
- Gas burner firing into black tube
- Vented via vacuum fan
- Radiant reflected downward by a reflector
- Unitary or system
- Totally enclosed flame
- Fail-safe devices

Radiant Heat
How it is Delivered?



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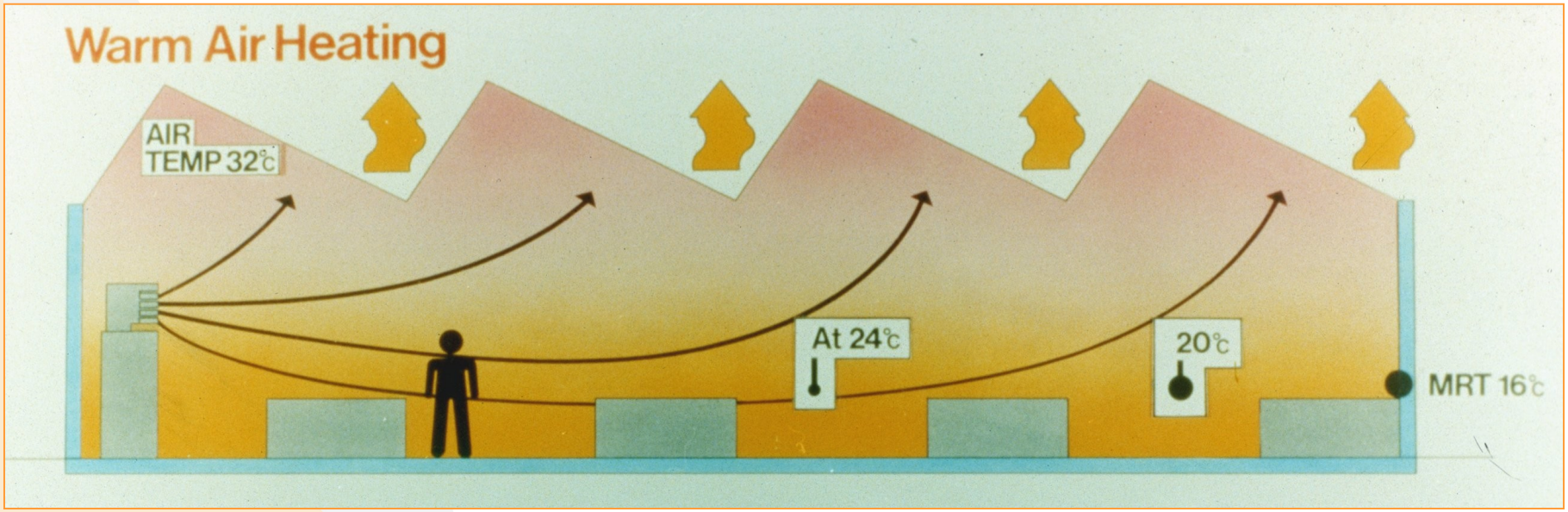
Why Radiant Heating Costs Less To Run?



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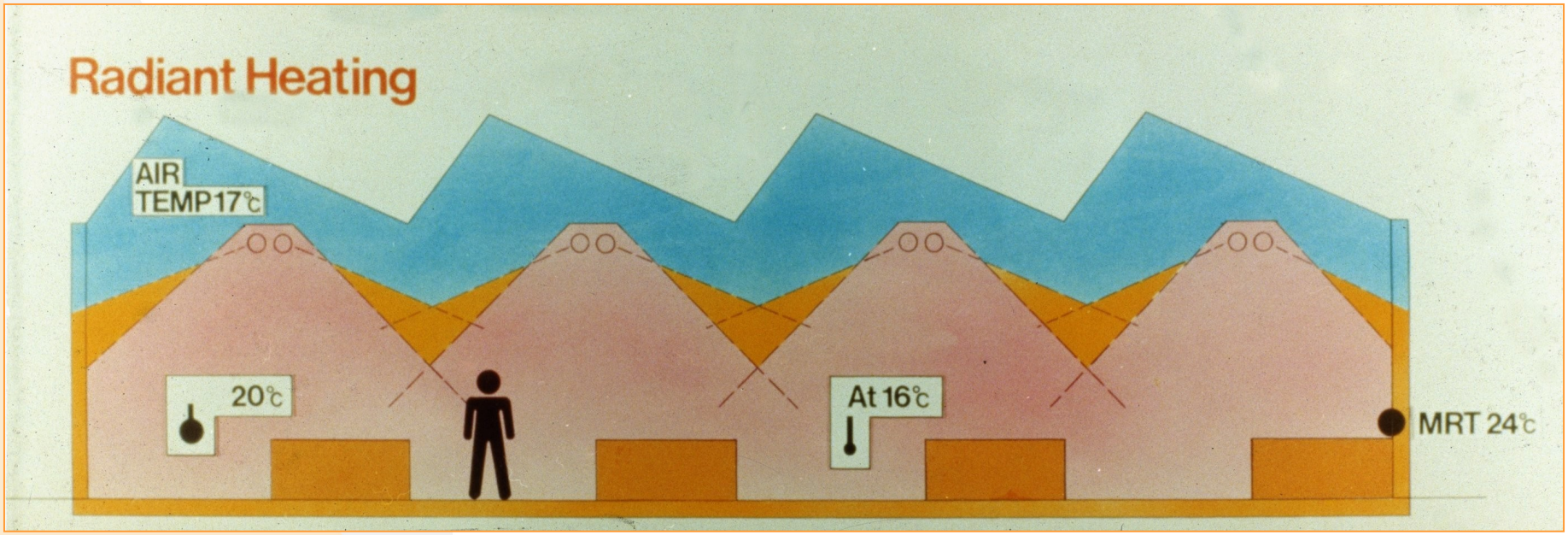

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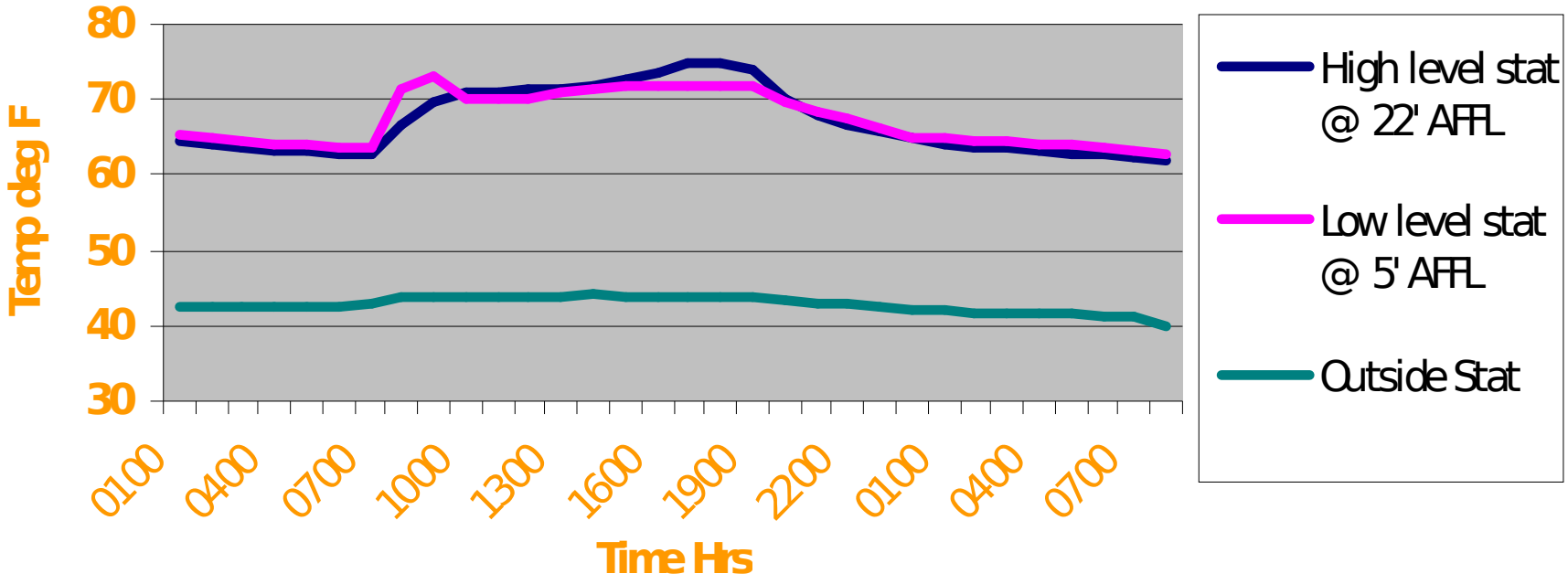
Case Study – Temp. Stratification 8/9 Feb 2001



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Gas Fired Radiant Tube Heating
The Benefits

- Creates warmth at low level
  - Can be mounted up to 100’
- Does not heat entire volume of the building
  - Reduced stratification
  - Minimises roof fabric and ventilation losses
- Can be zoned and controlled, heating occupied areas only
- Provides rapid heat up and recovery
  - 30 minutes to full operation

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Gas Fired Radiant Tube Heating
The Benefits

- High efficiency at the point of use-no distribution losses
- Warms floors, surfaces and tools, improving working conditions
- Eliminates the need for a utility room
  - Reducing building and operational costs
- Easy to install

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Gas Fired Radiant Tube Heating Savings!

- 10 Year Life Cycle Cost less than initial capital cost of warm air radiant system
- Annual energy cost savings
  - 65% versus HTHW
  - 35% versus warm air
- Minimal maintenance cost

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Product Solutions

- Continuous Radiant Tube
- ARC
  - 40 to 157,000 Btu/hr
  - In-line burners
  - Single exhaust point
  - Low intensity
  - Streamlined appearance
  - Over 90% combustion efficiency

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Product Solutions

- Radiant Tube
- ER Series
  - 40 to 150,000 Btu/hr
  - UT, Linear & Double Linear
  - Venting options
    - Individually flued
    - Herringbone combined flue
- PT Heater
  - 60 to 225,000 Btu/hr
    - Individually flued
    - 20’ to 80’ long

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Hangar and Workshop Heating - Factors to be considered

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Requirements of Buildings

- Large interior spaces - high roofs. Large volume of air
- Older buildings poorly insulated - prone to high air change rates
- Hangar doors can be left open - high air infiltration disrupts comfort conditions
  - Especially in exposed locations
- Rapid recovery to temperature essential
- Space can be used intermittently and sometimes partially
- Zone control is essential if energy is to be managed efficiently

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Viable Alternatives

- Wet systems
  - HTHW radiant panels
- Dry systems
  - Gas fired radiant tube
  - Gas indirect fired warm air
- Gas fired radiant tubes are the most efficient way of heating well ventilated large production and maintenance buildings

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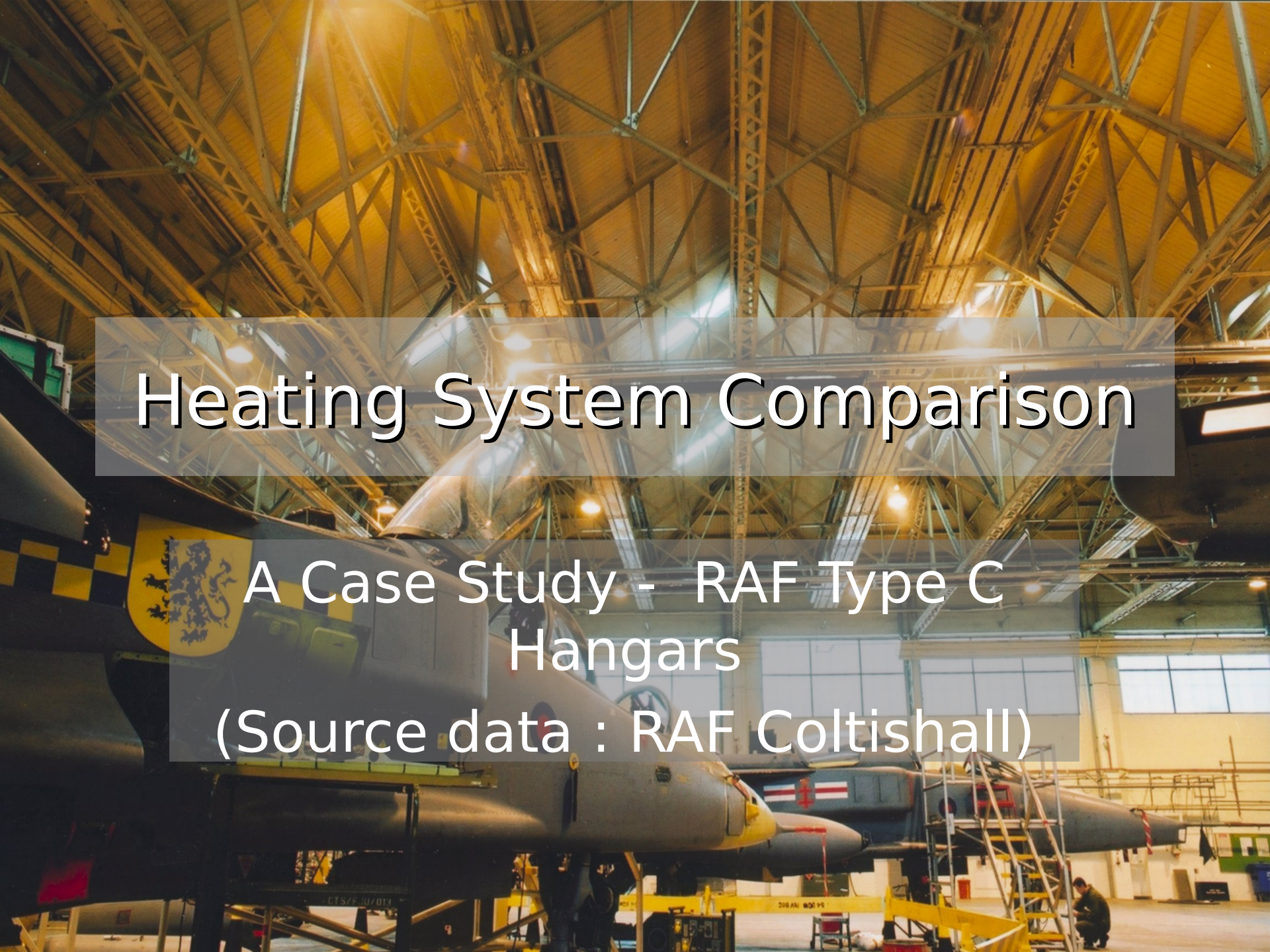


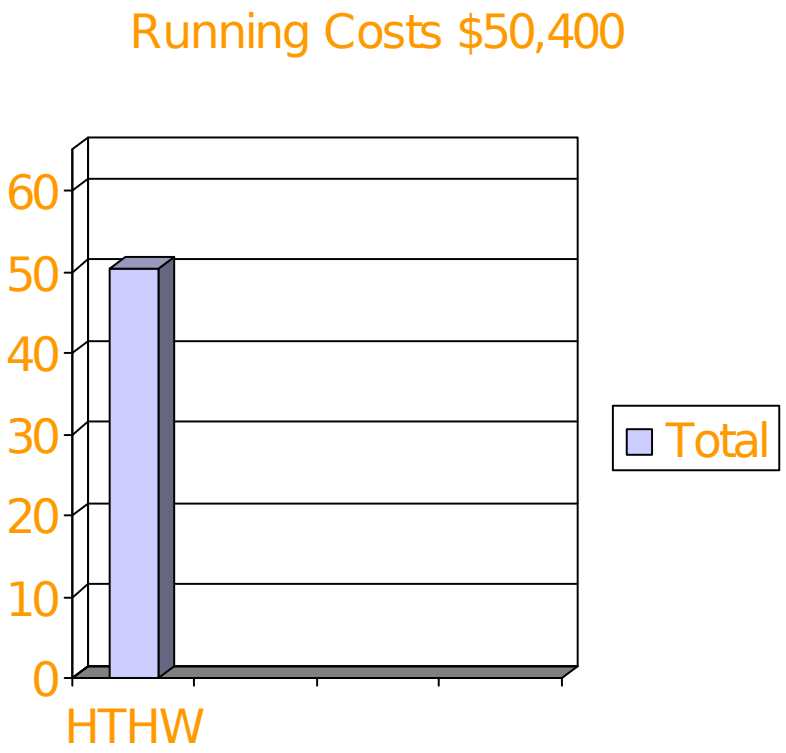
Heating System Comparison

A Case Study - RAF Type C Hangars

(Source data : RAF Coltishall)

Option #1 HTHW System

- Energy consumption
  - 136,480 therms p.a.
- Actual running cost
  - $ 50,400



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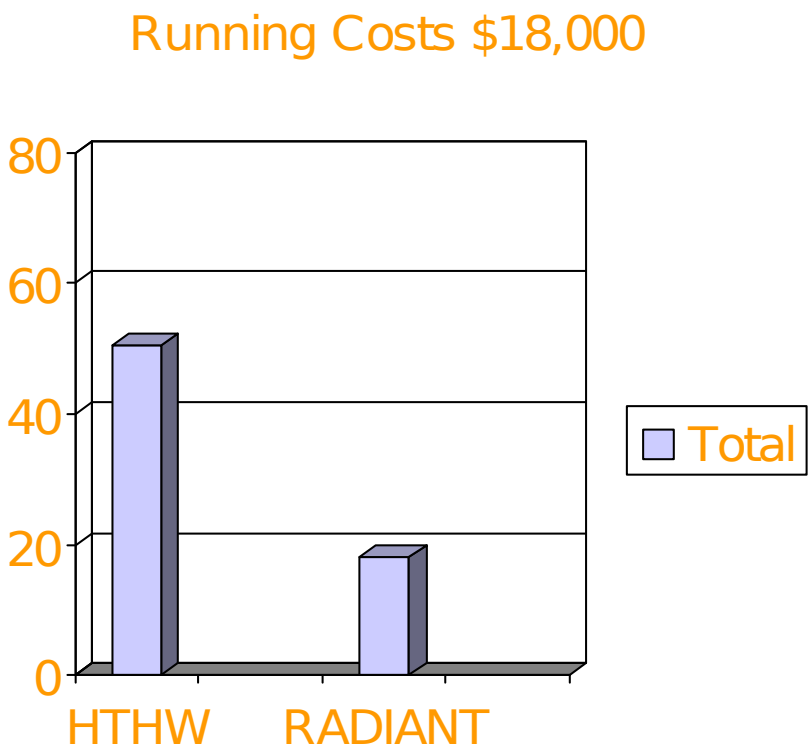
Option #2 Gas Fired Radiant

- Energy consumption
  - 48,743 therms p.a.
- Actual running cost
  - $ 18,000

64 % Saving



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Over 200 Military and Hangar Installations Worldwide

- Buckley AFB, CO
- Elemendorf AFB, AK
- Fort Carson AB, CO
- Guernsey, WY
- Kelly AFB, TX
- Little Rock AFB, AR
- McConnell AFB, KS
- Malmstrom AFB, MT
- Oceana Naval Air Station, VA
- Pueblo Army Depot, CO
- Sulfridge ANG, MI
- Stockton ANG, CA
- Tyndall AFB, F
- Warren AFB, WY

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Representative Case Studies in USA

- 10 year energy savings based on comparison with warm air systems and boiler plant
- For new and old aircraft hangars
- Available on CD ROM
- In the following areas:

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Representative Case Studies in USA

- Albuquerque NM
- Anchorage AK
- Baltimore MD
- Burlington VT
- Chicago IL
- El Paso TX
- Fairbanks TX
- Houston TX
- Memphis TN
- Phoenix AZ
- Salt Lake City UT
- San Francisco CA
- Seattle WA

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Military Buildings

- Aircraft Hangars
- Vehicle workshops and storage
- Stores areas and warehouses
- Garages
- Sports facilities
- Museums

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Commercial References

- American Airlines
- BP
- Chevrolet
- Chrysler
- Delta Airlines
- Eli Lily
- Firestone
- Green Bay Packers
- Hyundai
- Isuzu
- Lowes
- Nabisco
- Nissan
- Norwest Airlines
- Shell
- Schneider
- US Postal Service
- Wall-Mart

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Product Availability

- Radiant tube heaters are available from a number of American and European suppliers
- However, you will forgive me if, for the next few slides, I just talk about the best one!!

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Company Overview

- Established 1979
- Privately owned
- 215 employees
- $ 40m GROUP TURNOVER

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Company Development

- World wide market leader in radiant
- Export to over 35 countries
- Largest individual market is USA
- Facilities in IN, NC, CO, UT, TX
- Distributor network throughout USA
- Established over 20 years in USA
- We provide an American solution

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Company Standards

- Quality assurance
  - BS EN ISO 9000: 2000
  - All products CSA/AGA approved
    - Member of GAMA

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Company Services

- Sales support
  - Pre-contract
  - Contract
  - Post-contract
- In house design
  - Scheme drawings
  - Cost evaluation
  - Heat loss calculations
- On site support
  - Technical advice

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After Sales Support

- Technical and spares support
- Over night parts availability
- Extended warranties available

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Open Forum

(Click here for additional PDF files, provided by the speaker...)

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